ASSOCIATION OF

FEDERAL COMMUNICATIONS CONSULTING ENGINEERS

WASHINGTON, D.C.

November 9, 1999

Magalie Roman Salas, Secretary
Office of the Secretary, TW-A306
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

RE: Docket 93-177

Dear Ms. Salas:

Transmitted herewith for filing with the FCC are the original and four copies of the comments of AFCCE in the above-referenced matter. Also enclosed is an additional "return copy" that should be returned with our messenger.

If any questions arise in this matter, please contact the undersigned or Mr. Joseph M. Davis, AFCCE President.

Sincerely,

Cynthia M. Jacobson

Cynthia M. Jacobson
Vice President

ORIGINAL

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
An Inquiry Into the Commission's	)	
Policies and Rules Regarding AM	)	MM Docket No. 99-177
Radio Service Directional Antenna	)	
Performance Verification	)	

COMMENTS OF THE ASSOCIATION OF FEDERAL COMMUNICATIONS CONSULTING ENGINEERS ON NOTICE OF PROPOSED RULEMAKING

Introduction

The Association of Federal Communications Consulting Engineers (AFCCE), celebrating 50 years, is an organization that includes approximately 90 full members who are Registered Professional Engineers engaged in the practice of consulting engineering before the Federal Communications Commission.

AFCCE supports and commends the Commission for its efforts to review and, where possible, simplify or eliminate the regulatory and compliance burdens on AM broadcasters using directional antennas. Antenna proofs of performance impose a financial burden upon AM broadcasters, although it is not a burden that has been concealed by Commission policy, rules, or regulations from station owners. However, as the Commission notes in paragraph 7, "Prevention of interference among AM broadcast station [sic] remains a core regulatory function of this Commission." The AFCCE agrees that any changes in the rules must not compromise the technical integrity of the broadcast spectrum. The challenge for the Commission is to enact rule changes that reduce the burden on licensees while maintaining a reasonable ability to verify compliance.

Computer Modeling versus Proofs of Performance

Antenna proofs to verify performance of AM directional antenna systems have a long history in AM broadcasting. Field strength measurements are made at many points along several radials to show that the array is properly adjusted. A substantial amount of labor is required. The development of accurate monitoring equipment that measures the relative phases and amplitudes of the RF signal in each tower, along with computer modeling techniques, offers a significant potential for verifying array performance at lower cost.

The problems with field strength measurements to prove array performance are well known to the Commission and to the engineering community. The accuracy of field strength measurements can depend significantly on the experience of the person(s) making the measurements and reducing the data. The field environment can affect the readings, as can seasonal variations.

The use of computer modeling has its own set of problems. First, the inputs to the model assume the validity of the data about the physical parameters of the array such as tower height, spacing, and orientation. Second, verification of the results is as yet unresolved. Are field measurements or modeling the final authority in cases of dispute? Third, what are the limits that should be set on our ability to model an array and to include the effects of the environment. Under what conditions is the probable error in modeling larger or smaller than the probable error in field measurements?

Because of the complexity of the topic, AFCCE supported the request by the NAB and others to extend the comment period deadline so that an ad hoc meeting could be held on October 13, 1999 to discuss the use of computer modeling, as

well as the other issues in the NPRM. This meeting has been held with several AFCCE members in attendance.

It is the consensus of the AFCCE members and others at the meeting that the use of computer modeling should be the subject of a Further Notice of Proposed Rulemaking under the present docket. The topic is too important to ignore and too complex to address as a secondary issue. Making the topic a Further Notice keeps the issue on the table while allowing the other items in the NPRM to proceed.

Directional Antenna Proofs of Performance

The Commission currently requires a minimum of eight radials, each with a minimum of 30 points between zero and 25 or 34 kilometers (zero and 15.5 or 20 miles) for a full proof. A partial proof currently requires at least 10 points between three and 16 kilometers (two and 10 miles) for each radial used in the last full proof. The Commission proposes to reduce the requirements for a full proof to a minimum of six radials, each with a minimum of 15 points between zero and 15 kilometers (zero and nine miles). The Commission proposes to reduce the requirements for a partial proof to a minimum of eight points per radial with no other changes in the partial proof.

Full Proof of Performance

The purpose of a full proof of performance is to establish the fundamental base line for showing antenna performance and compliance. A full proof is required when the antenna is first constructed and when any permanent changes are made in the location, height, or directional radiating characteristics of the antenna. A full proof of performance is a rare event in the life of an AM station. Many stations have been on for decades and have not had a full proof of performance since the ones that were made when they were constructed.

The cost difference between a full proof using the present rules and a full proof using the proposed rules can be a small part of the engineering cost of building or modifying an AM array. However, the proposed changes, as minimum acceptable requirements, may in some cases reduce the cost burden associated with a full proof and do not appear to materially degrade the value of the proof measurements.

With regard to nondirectional stations which are required to conduct a full proof due to the proximity of reradiating structures, etc., the Commission proposes reducing the number of evenly spaced radials from eight to six, the same as the minimum number of radials proposed for any other full proof. In those cases where measurements are required for a nondirectional antenna because of the impending construction of a new tower nearby and a previous full proof does not exist, a full proof should also be required, provided the full proof requirements are simplified as proposed. The technical requirements are the same whether a previous full proof exists or not.

Partial Proof of Performance

The purpose of a partial proof of performance is to verify that the array is still in compliance. As noted in the NPRM, many things can trigger the need for a partial proof. If the monitoring point or antenna monitor reading limits are exceeded, if the antenna system is altered by attaching or replacing items such as guy wires, cables, isocouplers, other antennas, etc., or if the station has been dark for more than six months, a partial proof is needed to determine that the array is still functioning as intended. If the partial proof and the antenna monitor readings indicate compliance, there is a high degree of probability that a full proof would also show compliance.

Because of the diagnostic nature of a partial proof, a directional station can anticipate many partial proofs in the course of its existence. For this

reason, reducing the cost of a partial proof is more important than reducing the cost of a full proof. Reducing the cost of a partial proof also increases the likelihood that station management will authorize the measurements when the need is indicated.

We support reducing the number of required points per radial for a partial proof from the present 10 to the proposed eight because the cost savings may outweigh the increased engineering risk. The Commission should make clear its ability to require a full proof if a partial proof does not seem to agree with interference measurements or other indications of noncompliance. In addition, the Commission should increase substantially the fine for willful noncompliant operation.

Monitoring Points

Monitoring points are based on the full proof, not the partial proof. If a monitoring point needs to be changed because of construction or other factors, then the full proof data should be used rather than a radial partial proof. We agree with the Commission's proposal to assign limits to new monitoring points based on the last full proof of performance.

The Commission proposes eliminating the requirement for maps and directions for applicants using differential GPS-determined coordinates. This precludes the use of coordinates determined by survey or by techniques that may be developed in the future. We recommend that the Commission accept coordinates as a means of locating monitoring points but specify the required accuracy rather than the method. A description of the monitoring point should still be required to facilitate data collection.

Finally, regarding augmentation of radials which involve a required monitoring point, 47 C.F.R. 73.152(c)(2)(iv)(B) allows 120 percent augmentation of the actual measured inverse field value if the measured inverse field exceeds the value permitted by the standard pattern. If the data for a monitoring point radial is analyzed and found to be 99 percent of the standard pattern, the field strength limit for the monitoring point will be set at essentially the standard pattern value, leaving no room for drift or seasonal variations. If the data for a monitoring point radial is analyzed and found to be 101 percent of the standard pattern, the field strength limit can be set significantly above the standard pattern by augmenting the radial.

This is an incentive to analyze the data on monitoring point radials where the result is near the standard pattern value as above the standard pattern value. Since analyzing field strength data involves judgment as well as engineering, there is an inherent conflict.

The present Rules clearly intend to allow 20 percent monitor point tolerance for radials that need augmentation. We recommend the Commission apply the 20 percent tolerance uniformly as part of the present NPRM by allowing up to a positive 20 percent adjustment to monitoring point values for radials with measured radiation falling below the standard pattern value.

AM Station Equipment & Measurements

We agree with the Commission's proposal to delete the requirement for base current ammeters for those directional stations employing approved antenna sampling systems.

Antenna Monitors

We agree that 47 C.F.R. 73.53(c) can be moved to 47 C.F.R. 73.69. We are puzzled as to why the other requirements of 47 C.F.R. 73.53, with the possible exception of 47 C.F.R. 73.53(b)(1), impede the development of antenna monitor systems using advanced technology. These requirements are minimum requirements

that a monitor should pass for it to be used to verify and maintain array compliance on a day-to-day basis. A monitor that can not pass these requirements will be of limited value to the station licensee or to an FCC field inspector.

The use of voltage sampling devices as alternatives to sampling transformers and pick-up loops should be part of the Further Notice of Proposed Rulemaking covering computer modeling.

Impedance Measurements Across a Range of Frequencies

We agree with the proposal to delete the requirement to measure impedance across a range of frequencies. The Commission presently imposes no requirements on the audio quality of AM stations, which is the current reason for measuring impedance across the signal bandwidth. Measuring impedance across a range of frequencies should still be explicitly permitted as an alternate method for those cases where co-channel stations make on-frequency measurements difficult.

Common Point Impedance Measurements

We agree with the proposal to delete the requirement that the common point reactance should be adjusted to zero ohms.

Critical Arrays

We agree with the proposal to discontinue specifying the use of special precision monitors, provided that the monitor requirements continue to require stability over the present range of environmental and electrical parameters and that the monitor installed has sufficient accuracy and precision to assure compliance with the license requirements.

Respectfully Submitted,

Cynthia M. Jacobson
Vice President
November 9, 1999